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Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

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(54) Interaktives Führungssystem für Museen, Ausstellungen, Messen und Weiteres

(57) Technisches Problem der Erfindung
Gruppenführungen haben häufig den Nachteil, daß sie weder die unterschiedliche Vorbildung der Besucher, noch ihre verschiedenen Interessen berücksichtigen können. Auch der Einsatz technischer Hilfsmittel erlaubt meist nur weitgehend standardisierte Führungen. Ihr Einsatz scheitert leicht an der komplexen Bedienung. Individuelle Führer, die sowohl fachlich als auch didaktisch geschult sind, sind regelmäßig zu kostenaufwendig.
Lösung des Problems
Ein Ortungssystem stellt fest, an welchem Exponat sich ein Besucher gerade befindet. Drahtlos werden dem Besucher über einen Kopfhörer Informationen zu dem betreffenden Exponat angeboten, die er sprachgesteuert über ein Mikrophon sowohl in bezug auf die Detailtiefe als auch auf sein persönliches Interesse hin beeinflussen kann.
Ein Lernalgorithmus wertet die Laufwege und die Reaktionen des Besuchers aus, so daß die im folgenden angebotenen Inf rmationen sich am Erfahrungswissen des Systems ori ntieren.
Individuelle Führungen können so überzeugend und kostengünstig simuliert w rden.
Anwendungsgebiet
Das System eignet sich z. B. für den Einsatz in Museen, Ausstellungen, Messen und bei Stadtführungen.

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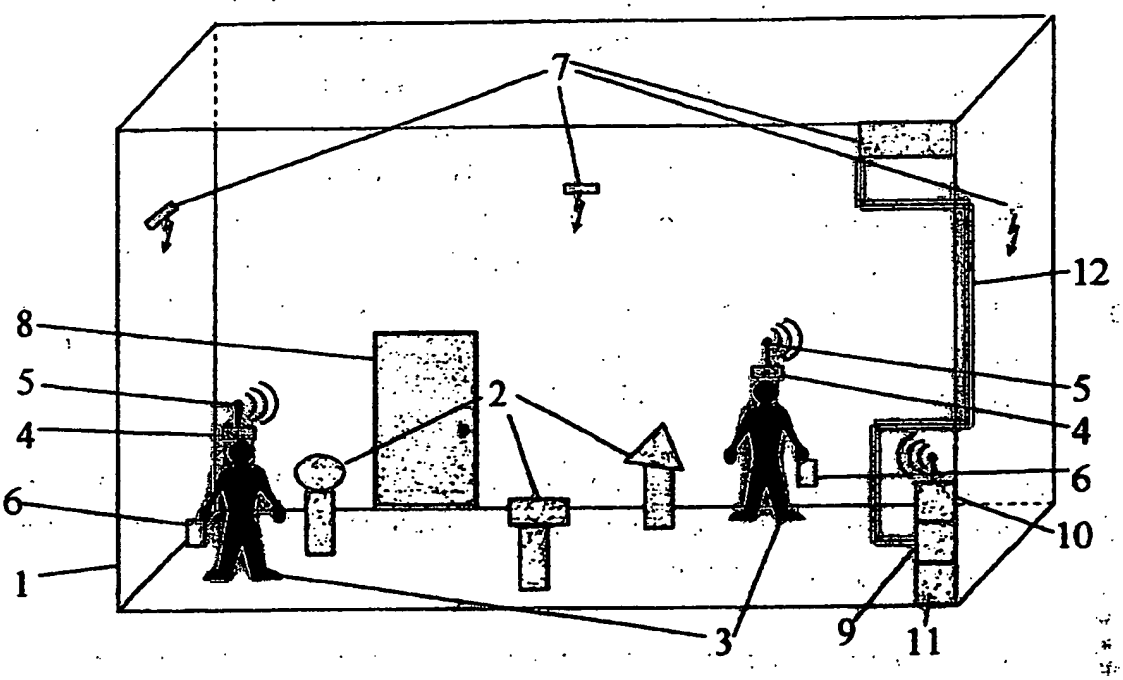
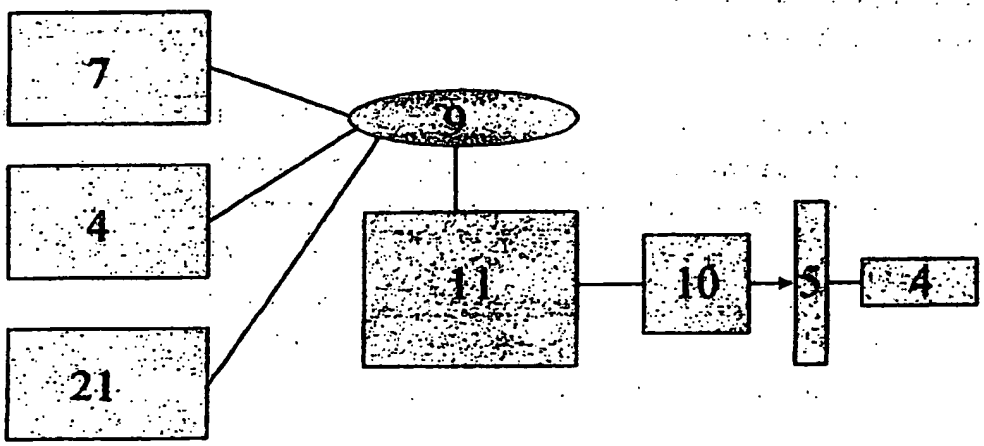
Figur 1



Figur 2



Description

Exhibits in museums and exhibitions such as, e.g. technical devices or works of fine art are usually made accessible and explained to visitors by text on accompanying panels, by guided tours with verbal explanations by a guide, by audio-based media such as, e.g. by means of portable cassette or compact disc players, mobile or immobile headphones attached to the exhibits, by additional visual means such as touch screen monitors or video reproduction or by written media such as accompanying brochures.

At trade fairs, it is in most cases maps with written descriptions and colours or symbols which are used for orientating the visitor.

When finding out about local situations in the open, for instance about an historic town centre worth seing, the visitor orientates himself by means of maps or participates in a standardized guided tour, in most cases in a relatively large group.

Together or taken by themselves, these known methods of conveying information have the following disadvantages, among others:

- Since it is not possible to take into consideration differences in previous education and different interests of visitors, too much or too little is demanded of many visitors by the information on offer and the guidance does not meet the expectations of the visitors and the aim of the exhibition, or only to a restricted extent.

- Guidance with the aid of technical aids requires that the users additionally learn to operate and examine the aids themselves and efficient use of

such means frequently fails because the operation is too complex for the average visitor.

- As a rule, guidance tailored to the individual needs of each visitor is not possible, or only possible to a very restricted extent or only with individual guides trained to become qualified both scientifically and didactically who are thus very expensive.

- Absorbing visual stimuli in the form of text requires a high degree of concentration and leads to fatigue phenomena.

- Conventional audio-based guidance systems require complicated operation by switches or keys and, in addition, the information on offer is uniform for all visitors and thus limited.

- Conventional guidance methods which take into consideration the personal situation of the individual visitor, for instance in accordance with age, sex, level of education and interests, necessitate an elaborate data acquisition, for instance by means of questionnaires, which is expensive both with regard to cost and personnel.

- Relatively large trade fairs in particular are very confusing to the visitor, and much time is lost by searching for the stands which are of special interest to this visitor.

- Guided tours of groups in the open take place within a rigid time frame and, as a rule, only offer standardized information.

These disadvantages are eliminated or minimized by the system cited in Patent Claims 1 and 2 in that the system approximately simulates a personal guide.

The position finding system automatically detects the position of the visitor in the room and establishes at which exhibit the visitor is currently located. There is no typing in of, for instance, an exhibit number as in some conventional audio systems. Moreover, the previous path of the visitor through the exhibition can be established and the further guidance of the visitor can be oriented accordingly; it is also possible to draw conclusions about the interests of the visitor.

The visitor can himself control the flow of information via a microphone. By continuously interrogating the responses of the visitor to the information offered, the system automatically recognizes the type of explanations desired by the visitor, for example relating to the history, to the operation, to the practical fields of use or the economic relationships in the case of a technical device, and how detailed the explanations should be. Operation by voice without predefined commands develops in a simple and intuitive manner and the visitor can concentrate completely on the exhibits and the information itself.

Using the responses of the visitor to the initially standardized information, the length of time he stays at the exhibits and on the basis of his preferences in selecting the exhibits, established by the position finding system, the system assembles, via a computer-based algorithm, on the basis of a comprehensive database with sound documents (spoken explanations and, if necessary, also original sound documents relating to the exhibits), for each visitor an individual guided tour which meets the needs of the visitor with regard to the type and depth of information. However, this guided tour remains flexible at all times due to the continuous feedback from the visitor. Thus, the visitor who is already well informed is not bored by explanations which are too detailed for him and the visitor with less prior knowledge is not overtaxed.

The information relating to the exhibits, which is stored in a database, can be arbitrarily extended with regard to the type and depth of information, it is possible to use different languages without changing the technical means of communication and the guided tour can even be carried out at different language levels within a language, for example with a separate language level for children and the information is easily available to each visitor via headphones.

Due to the adaptability of the system, the guided tour gradually adapts to the responses of the visitor and no prior data acquisition is necessary.

In an embodiment according to Patent Claim 2, the system can also be used in the open, for example for guided city tours. In this case, the system can easily steer the visitor through the streets and provide as required explanations relating to the localities being passed in each case.

An illustrative example of the invention according to Patent Claim 1 is explained with reference to Figures 1 to 3, in which:

Figure 1 shows the installation of the system, e.g. in an exhibition room;

Figure 2 shows a block diagram of the interaction of the individual system components;

Figure 3 shows an illustrative structure of an information database.

In the exhibition room (1), exhibits e_1 to e_n (2) are located. The visitors b_1 to b_n (3) are moving freely through the room and are looking at the exhibits (2).

Each visitor wears a communication unit (4) consisting of headphones and a microphone and a transceiver device with power supply (5) and possibly a device which enables the visitor to be located (6).

A position finding system (7) installed in the room constantly determines the position of the respective visitor in the room preferably by means of cross bearing by radio, by means of ultrasound, infrared bearing or by means of optical tracking, for instance by cameras, and a corresponding control programme. The correlation with the individual visitors takes place by means of different frequencies or setting up a path list internal to the system for each visitor starting from a common entrance (8).

The position finding system (7) and the communication unit (4) are connected to the system control (9) which is preferably also installed in the room. The position finding system (7) communicates with the system control (9) preferably via electrical cables and the communication unit (4) communicates with the system control (9) via a transceiver device (5 and 10), preferably by electromagnetic radio waves. To differentiate between the various visitors, either the frequencies are varied or preferably the information is exchanged in digitized form, provided with an identification code at the beginning of the information package, between the system control (9) and the communication units (4) of the visitors via in each case a common transmitting and receiving frequency.

The system control (9) assembles, by means of the input parameters (for instance previous path and current position of the visitor, preferably also the direction in which he is looking, previous responses of the visitor to information already provided) from a database (11) with a multiplicity of individual information items stored in the system, preferably in

digitized form as hard disk, read only memory or CD ROM, an information package fitting the exhibit currently being looked at or the current position of each visitor and transmits it via the transceiver devices (10 and 5) to the communication units (4).

Selection from the database (11) is carried out by means of an algorithm determined by machine, preferably a so-called "learning system", for instance by implementing a neuron network, with means of information technology.

Figure 2 shows the quantities used in the control system (9), the processing and the outputting in overview: the position finding system (7) supplies information on the in each case current position of the visitor in the room, the responses and instructions of the visitor are determined (4) via the microphone interrogation with voice recognition. Internally, the previous path of the visitor through the room, the exhibits previously looked at, the information previously supplied and the previous responses of the visitor to the information previously supplied are registered via parameters as empirical knowledge of the system (21) and continuously evaluated. The control programme of the system control (9) evaluates the input quantities in accordance with an algorithm to be established and selects from the database (11) the corresponding individually adapted information which is forwarded to the headphones of the visitor (4) via the central transceiver unit (10) and the mobile transceiver unit (5).

The database (11 and in detail in figure 3) contains apart from a basic store of important basic information (12) information relating to different subject areas (13-15) with respect to the exhibit for each exhibit or each position in the room, respectively, which information, in turn, is branched further from the

general to the specific or, respectively, from an overview of the individual subject to detailed questions (16-18). Various versions of the same information, for instance at different language levels, and from different starting points, with respect to language and contents, from the in each case preceding information are preferably stored in the database, as well as general transition phrases (20), so that a uniform text is produced as a result. To enable the guided tour to be shortened for visitors with prior knowledge in individual areas, the database preferably also contains one or more abbreviated versions of logically preceding information units (19) for each information unit, which is placed before the detailed information selected by the system.

The system finds out whether the information currently being offered meets with the approval or disapproval of the visitor via a voice recognition programme with a preferably open number of possible responses of the visitor (for instance an approving voice field with recognizable words such as "yes", "interesting", "exciting", "fantastic", "good", "I see", "go on", "more detailed", "what does this mean" etc. and a disapproving voice field such as "boring", "no", "it makes no difference" etc.) or via questions set by the system itself or implicit with limited possibilities to answer. In the case of approval or in the case of doubt, more information is offered and in the case of disapproval, the system, after a transition, turns to a different field of information and the same applies to the case where the visitor turns to another exhibit. If the visitor does not respond at all, the system transmits a standardized guided tour which, for instance, conveys the most important exhibits and there in each case the basic information and some established individual information items.

The system can recognize the interests of the visitor and select the information then offered accordingly by means of a "learning system".

The selection of the information in accordance with the core information offered to each visitor is carried out, e.g. by using subject parameters for the individual subject areas (figure 3, 13-16) which, in the case of approval by the visitor to information offered for this area is increased by a particular value and in the case of disapproval is reduced or set to zero. The individual subject areas are given preference parameters which, having equal values initially, are incremented or decremented by means of the responses of the visitor, e.g. to the basic information for each subject area offered at the first exhibit so that at the next exhibit, the subject area having the highest preference parameter is offered first. The depth of detail within the subject areas can be established, for example, via an educational parameter which, starting from the same standard value for each subject area, is incremented or decremented by means of the visitor responses, a defined bandwidth of values corresponding to a particular depth of detail.

A comparison of these three values provides for each exhibit and therefore each subject area a preference list of information to be offered which is sequentially stepped through as long as there are no deviations due to new responses by the visitor.

List of reference designations

1 Exhibition room
2 Exhibits e_1 to e_n
3 Visitors b_1 to b_m
4 Communication unit
5 Mobile transceiver device
6 Position finding device (portable part)

7 Position finding system (permanently installed part)
8 Common entrance
9 Control system
10 Central transceiver device
11 Database
12 Basic information
13 Subject area A
14 Subject area B
15 Subject area C
16 Detailed information E_A...E_C
17 Detailed information F_A...F_C
18 Detailed information G_A...G_C
19 Assembled information H_A...H_C
20 Transition phrases
21 Empirical knowledge of the system

Patent claims

1. Audio-based guidance system for closed rooms, in which
- the position of the visitor in the room is determined by an electronic position finding system and in which the selection of the information is adjusted,
- the visitor can himself determine the type and depth of information by means of voice input,
- the system assembles an individually adapted offer of information from the previous responses of the visitor by means of a computer-based algorithm,
- the information is forwarded to the user by means of a central or decentralized transmitting device or via a portable media carrier.

2. Audio-based guidance system for use in the open according to Patent Claim 1, the position of the persons to be guided in the open being determined by an electronic position finding system (for

instance by means of satellite direction finding (so-called GPS)) and being inserted into the selection of the information.

2 pages of drawings

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Figure 1

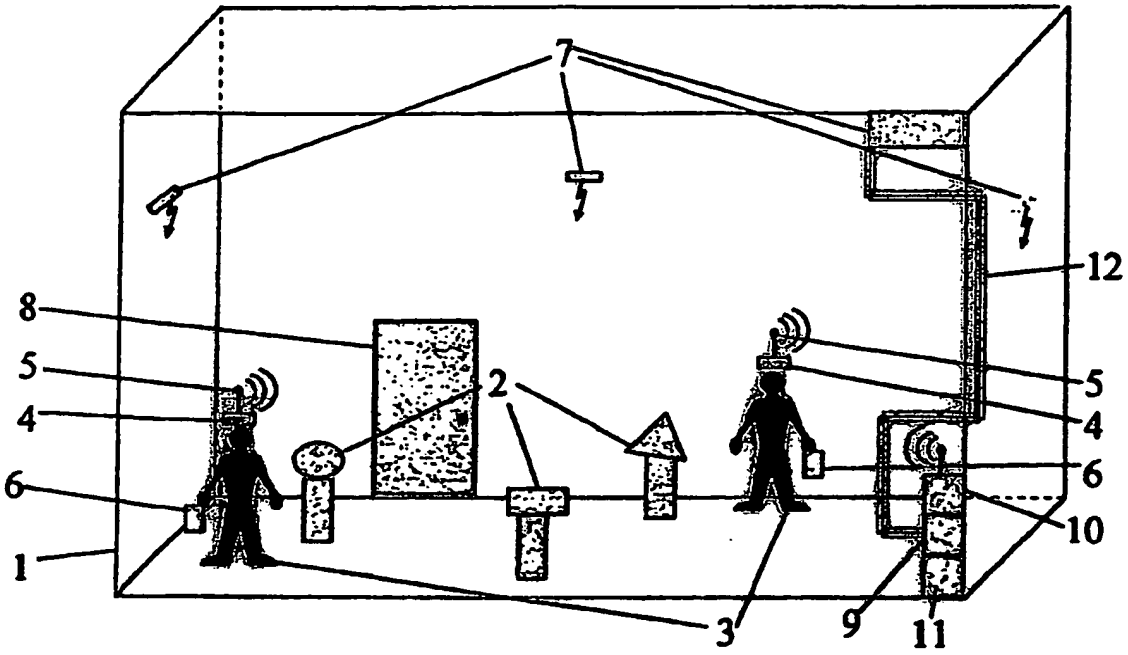

Figure 2

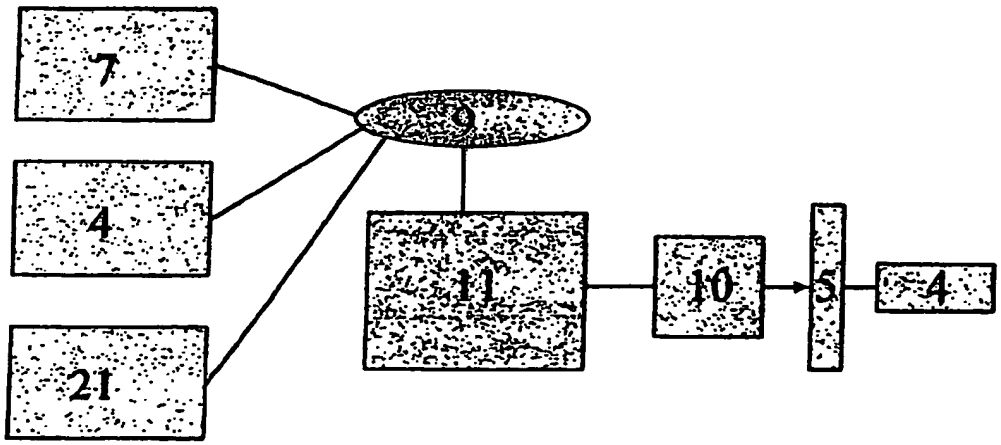

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Figure 3